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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,313	06/19/2001	Geun Su Lee	30205/37456	4829

4743 7590 05/19/2003

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CHICAGO, IL 60606-6357

EXAMINER
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THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

11

DATE MAILED: 05/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

A21

**Office Action Summary**

Application No.

09/884,313

Applicant(s)

LEE ET AL.

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 February 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 4-7 and 14-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 8-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This is written in reference to application number 09/884313 filed on June 19, 2001 and published as US 2002/0061461 on May 23, 2002.

#### ***Terminal Disclaimer***

1. The terminal disclaimer filed on February 24, 2003 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of 09/862199 has been reviewed and is NOT accepted.
2. The person who signed the terminal disclaimer is not recognized as an officer of the assignee, and he/she has not been established as being authorized to act on behalf of the assignee. See MPEP § 324.
3. An attorney or agent, not of record, is not authorized to sign a terminal disclaimer in the capacity as an attorney or agent acting in a representative capacity as provided by 37 CFR 1.34 (a). See 37 CFR 1.321(b) and/or (c).

#### ***Response to Amendment***

4. Claims 1-21 are currently pending. Claims 4-7 and 14-21 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 7.

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5. The amendment to the instant claims is sufficient to overcome the claim objection and rejections under 35 USC 112, 2<sup>nd</sup> paragraph as set forth in the previous office action.

***Priority***

6. The translation of foreign priority document(s) KR 2000-34103 has (have) been entered and fully considered.

7. The said translation is sufficient to perfect the priority date of June 21, 2000, thus overcoming the rejection of the instant claims under 35 USC 102(e) as set forth in the previous office action.

***Double Patenting***

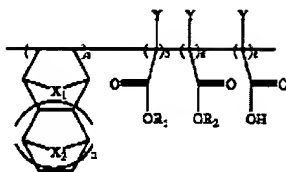
8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

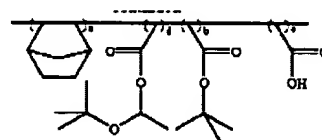
9. Claims 1-3 and 8-13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 and 9-14 of copending Application No. 09/862199 (US 2002/0018960A1). Although the conflicting claims are not identical, they are not patentably distinct from each other because they each pertain to a photoresist polymer and composition containing the same. Lee ('199) claims a

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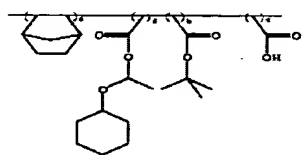


polymer having the formula

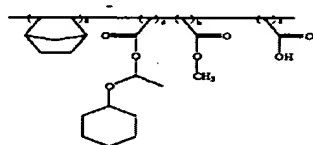
wherein n is 0; R1 is a substituted or

unsubstituted linear or branched C1-10 alkyl; R2 is a  $-\text{CH}(\text{CH}_3)\text{OR}_4$ . Claim 2 set forth the

preferred embodiments. Specifically the following compounds



, and



meet the limitations of the claimed

formula 1 wherein claimed monomers "a", "c" and "f" are present. R is t-butyl, cyclohexyl respectively are acid labile groups and X is  $\text{CH}_2$ . Lee ('199) also claims a photoresist composition comprising the said polymer, a photoacid generator and an organic solvent. It would have been obvious to one of ordinary skill in the art to make a photoresist polymer according to claim 1 of Lee ('199) wherein R2 is selected from the preferred substituents of claim 2 and to further use the said polymer in a photoresist composition according to claim 9.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

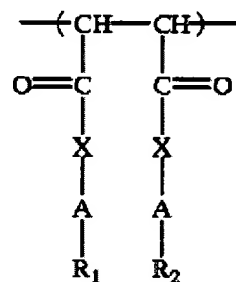
### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

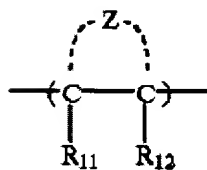
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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-3 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 6,159,655 A). Sato teaches a positive photoresist composition comprising a resin, which can be decomposed by the action of an acid to increase its solubility in an alkali and a compound, which generates an acid by irradiation with an actinic ray or radiation. The said resin comprises a polymer that contains as constitutional repeating units both the units represented by the following formula (I) and (II) and further has a group which decomposes



by the action of an acid. Formula (I) and (II) have the structures: (I) and



(II) wherein X is oxygen, sulfur, -NH, -NHSO<sub>2</sub> or -NHSO<sub>2</sub>NH; A is a single

bond or a divalent linkage group; R<sub>1</sub> and R<sub>2</sub> each independently represent hydrogen, cyano, hydroxyl, -COOH, -COOR<sub>5</sub>, -CO-NH-R<sub>6</sub>, or -CO-NH-SO<sub>2</sub>-R<sub>6</sub>; R<sub>5</sub> represents a substituted or unsubstituted alkyl or cyclic hydrocarbon or a group Y which are lactone derivatives; R<sub>6</sub> represents a substituted or unsubstituted alkyl or cyclic hydrocarbon; and R<sub>11</sub> and R<sub>12</sub> each independently represent hydrogen, cyano, halogen, or a substituted or unsubstituted alkyl

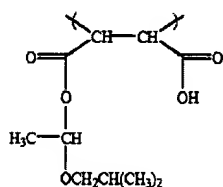
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group (c. 3, l. 25-c. 4, l. 44). Suitable examples represented by formula (I) include repeating unit [I-1] to [I-65] (c. 6, l. 47-c. 15, l. 50). Examples of repeating units represented by formula (II) include repeating units [II-1] to [II-166] (c. 22, l. 11-c. 54, l. 23). The taught resin can contain repeating units derived from various monomers for the purposes of controlling dry etching resistance, suitability for standard developers, adhesiveness to a substrate and resist profile in addition to the one or more repeating units of formula (I) and one or more repeating units of formula (II) (c. 54, l. 25-3). In the resin, the proportions of the repeating units represented by formula (I) and (II) can be determined appropriately by considering the desired dry etching resistance and sensitivity of the resist obtained, prevention of cracking in resist patterns, adhesiveness to a substrate, resist profile and further general requirements for resist such as resolution and heat resistance. The suitable proportion of formula (I) and (II) in the total repeating units is generally 30-70 mole % (c. 59, l. 6-44). One of ordinary skill in the art would have been motivated by this teachings of Sato to adjust the proportion of formula (I) and (II) in order to receive optimal results. In re Boesch {617 F.2d 272, 205 USPQ 215 (CCPA 1980)} has established that it is not inventive to discover optimum or workable ranges by routine experimentation where general conditions are disclosed in the prior art.

The resin of the taught invention can be generally synthesized by copolymerizing a monomer corresponding to the repeating unit of formula (II), maleic anhydride and, additional monomers as needed. Maleic anhydride is subjected to ring-opening esterification with alcohols or hydrolysis under a basic or acidic condition and then converting the thus produced carboxylic acid moieties into desired substituent groups (c. 59, l. 45-53). One of

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ordinary skill in the art would have been motivated to use any of the taught substituent groups to produce the carboxylic acid moieties. Specifically, the limitations of the instant claims are met when A is a divalent linking group, R1 is an alkoxy group, a cyclic hydrocarbon group, a substituted or unsubstituted alkyl or a -COOR5 group wherein R5 is a substituted or unsubstituted alkyl, a cyclic hydrocarbon or a -Y which is a lactone type derivative and R2 is hydrogen. Such a compound is represent by formula (I-7), which has the



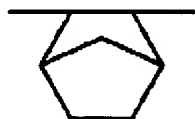
structure: (c. 7, l. 40). It is the examiner's position that the said groups for R1 would implicitly be acid labile.

Suitable examples of the required photoacid generators include 2-oxocyclohexyl group containing aliphatic alkylsulfonates and compounds represented by formula (VI-IX) (c. 60, 39-53). It is the examiner's position that formula (VII) encompasses the limitations of claimed photoacid generator n-decyl disulfone when R12 and R13 is a decyl group; and formula (IX) meets the limitation of claimed photoacid generator phthalimidotrifluoromethane sulfonate when R16 and R17 form a ring and R18 is a perfluoroalkyl group. Sato teaches that compounds of formula (IX) are especially advantageous with respect to sensitivity (c. 61, l. 1-18). The amount of photoacid generator is from 0.1-20% by weight to the total solid content in the composition. Photoacid generators such as trihalomethyl-substituted oxazoles, iodonium salts, disulfone compounds, etc. may be further added in combination with the above recited ones (c. 61, l. 54-c. 78, l. 10).



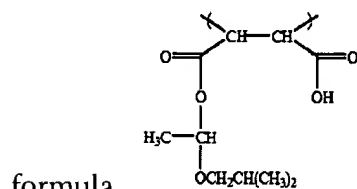
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Synthesis example 6 teaches the synthesis of resin F comprising a repeating unit (II-

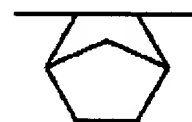


147) having the structure: (II-147) (c. 80, l. 44-c. 81, l. 3). The taught resin is admixed with 4-hydroxynaphthyldimethylsulfonium triflate as an acid generator and dissolved in 2-heptanone to form a photoresist composition. The said composition was coated on a silicon substrate and dried for 90 seconds at 130°C. The said film was then exposed using an ArF excimer laser over a range of 2mJ/cm<sup>2</sup> to 100mJ/cm<sup>2</sup> and heated at 130°C for 90 seconds. Thereafter, it was developed with TMAH to form a pattern (c. 81, l. 59-c. 82, l. 17).

It is the examiner's position that the exemplified components are the preferred embodiments of the taught invention. One of ordinary skill in the art would have been motivated by the teachings of Sato, in light of the synthesis example 6, to make a photoresist composition comprising formula (I) and formula (II) wherein formula I is similar to the

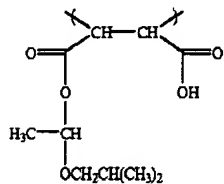


(I-7) and formula II is the preferred compound



(II-147) in order to produce a composition capable of forming highly precise patterns by using light in the far UV region (c. 1, l. 5-12). It is the examiner's position that compound

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(I-7) meets the limitation of claimed repeating units "c" and "f" when Y is

a C2 alkylene and R is the acid labile group isobutyl. This position is supported by the teachings of Sato that the taught copolymer is formed by subjecting maleic anhydride to ring-opening esterification with alcohols or hydrolysis under a basic or acidic condition and then converting the thus produced carboxylic acid moieties into desired substituent groups (see c. 59, l. 45-53). The examiner further notes that the claimed monomer units "b", "d" and "e" are not required to be present (i.e., b, d, e=0).

### *Conclusion*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

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A handwritten signature in black ink, reading "Yvette Clarke Thornton". The signature is written in a cursive, flowing style with a large, stylized "Y" and "T".

Yvette Clarke Thornton  
Junior Examiner  
Art Unit 1752

yct

May 16, 2003